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MINERALS PROGRAM
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DIVISION OF
OIL GAS & MINING

April 18, 1991

Mr. Frank Wicks
Vice President & General Manager
Barrick Mercur Gold Mine
P.O. Box 838
Tooele, Utah 84074

RE: Approval of February 28, 1991 Isotope
Ground Water Geochemistry Report, and
Comments on February, 1991 Joint and
Fracture Characterization Study; Ground
Water Quality Discharge Permit No.
UGW450001.

Dear Mr. Wicks:

We have reviewed both the Isotope Ground Water Geochemistry Report and the Joint and Fracture Characterization Study, as referenced above and required by the December 18, 1990 Conditional Approval for Dump Leach No. 3.

We agree with the conclusions offered in the isotope geochemistry report, that the ground water in Wells MW-10, 11, and 13 is meteoric in origin and has entered the aquifer within the last 40 years. This information will undoubtedly be very useful in predicting the vertical permeability of the vadose and saturated zones for the ground water modeling to be conducted in the near future. This letter constitutes approval of the isotope report.

We agree with the results of the Joint and Fracture Characterization Study which show that the northeast trending joint set appears to be twice as permeable as the southeast trending set. As outlined in the report, packer tests conducted on nearby boreholes have shown the permeability of the limestone foundation is approximately of the same order of magnitude as the specific capacity pump tests conducted recently on the existing monitoring wells at the site. Because this testing has provided a range of values, we expect that the sensitivity analysis to be conducted with the ground water modeling will adequately bracket the ranges of possible horizontal permeability of the domain.

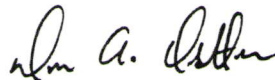
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Based on the point maxima shown for joint set D1 and center of the population distribution for set D2 on Plate 10 of the report, it is apparent that the angle between the strike of these two sets is approximately 60° , or a conjugate relationship. This poses a problem in that the proposed ground water model requires an orthogonal relationship between the horizontal axes of hydraulic conductivity. Consequently, before any three dimensional ground water flow modeling is done, Barrick must justify how a conjugate joint orientation can be adequately represented by orthogonal horizontal axes in the model. As outlined by your consultant during our meeting of April 1, 1991, this may be reconciled with further statistical analysis to show that the center of gravity of joint set D1/D3 distribution on Plate 10 is orthogonal with the joint set D2. If this approach is taken Barrick must justify why the center of gravity of the population would be the predominant orientation of hydraulic conductivity and not the point maxima for joint distribution. This problem may also be reconciled by resolving to use the orthogonal approach as a necessary simplifying assumption, and then adjusting or translating the resultant flow directions the model predicts, accordingly, in order to account for this assumption. Other alternatives may also be available.

Once the conjugate joint set relationship is resolved for the ground water model we will be happy to approve the Joint and Fracture Characterization Study. If you have any questions or comments, please contact Loren Morton at 538-6146. We appreciate your continued cooperation.

Sincerely,

Utah Water Pollution Control Committee



Don A. Ostler, P.E.
Executive Secretary

cc: George Condrat, Dames & Moore
Wayne Hedberg, DOGM
Myron Bateman, Tooele County Health Dept.

LBM:lm

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